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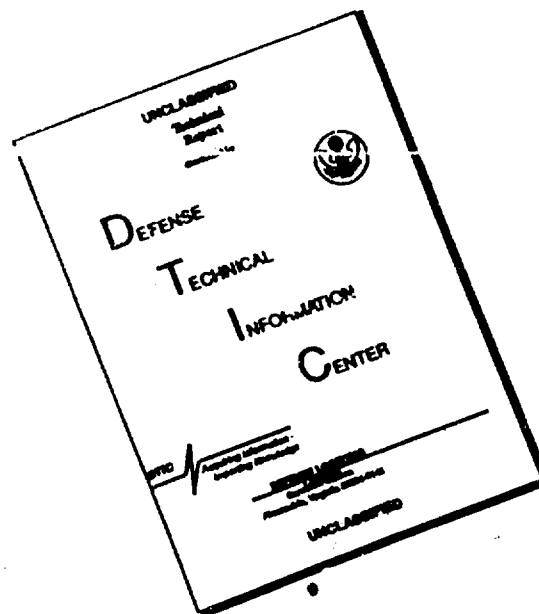
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MIXED INFECTION OF (EXANTHEMATIC) TYPHUS AND RELAPSING FEVER

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A menacing epidemic which broke out in 1919 and 1920 in southern Russia furnished interesting material for observations and study of infectious diseases especially since the form of the diseases differed greatly, in the majority of cases, from the general descriptions, both in their symptomatology and in the course of their recovery.

The study of them, in as far as is known, has disclosed some new methods of diagnosis and medical treatment. Thus the incubation period of ex. typhus was determined, the temperature curve was studied, the Weil-Felix Wiener reaction was applied to the populace; salvansan (arsphenamine) was applied during treatment of relapsing fever; adrenalin, strichnine and caffeine were generally employed during treatment of ex. typhus and finally even the actual "carriers" of ex. typhus were found by Prof. Barykin.

Epidemic

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The epidemic of ex. typhus in southern Russia preceded influenza (as noted by D.D. Pletnev in his monograph for Kharkov in particular). It was brought from western Europe by our prisoners of war when they returned from prison in horribly unsanitary conditions. Many of them perished on the way, many returned to their birthplace only to die in their hospitals. Returning in cold weather on open platform cars, they often arrived at the hospital with severe cyanosis, weak pulse and generally with both lungs diseased (which defied resolution). After mingling for a few hours, they perished in spite of all the efforts that were made and the efforts of the medical personnel to save them. In some instances cabmen picked up sick persons at the station to take to the hospital and although the ride was not longer than 10 minutes they were dead on arrival.

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Following behind the influenza, epidemics of ex. typhus and relapsing fever burst forth (in the end of 1919 and the beginning of 1920) caused through conditions of contagion by insects during the evacuation of the prisoners of war and refugees on the journey. Lack of fuel, non-functioning bathtubs, insufficient partial changes of linen, unsanitary conditions of the railroad cars, railroad stations -- all of these contributed to the severe development of the epidemic especially since the refugees who settled with natives or friends spread the epidemic among the native population. The heart of the epidemic was in the region of Zherink Station, the key point of evacuation. From here the epidemic spread along the railroad routes following eschelons (of troops) and evacuees. The ill, in the winter of 1919-20 arrived with frostbitten extremities caused by unheated apartments, with the result that there were a very large number of different complications: chief of which was
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gangrene of the extremities. This complication began as a pain in the legs (in the toes). The fingers were pale, cold, slightly cyanotic; sometimes the picture of the secondary stages of frostbite were present. The arterial pulse could not be detected and the fingers began to become blackened and mummified. Generally, one had to resort to amputation. This complication is noted in young people who, not suffering from sclerosis of the blood vessels, have only the extremities frost bitten on the journey (the toes). Thus, I recall this grievous picture: A young woman, a war bride, who came by train and whose gangrene began on the tenth day of the disease, a slight case of ex. typhus, was crippled by the amputation of both feet.---Recovered from the typhus, she remains a cripple from the amputation.

With such conditions there was much material for observation. It is a pity that the overburden of work and the difficult external conditions did not allow ~~of~~ me to concentrate on and systematize the material. Thus among other things, it was determined, as pointed out by Prof. D.D.Pletnev in the book "Exanthematic Typhus" and corroborated by Prof. Svenson during the southern epidemic, that most weakened organisms had weakened connections of the nervous and hormone cells which are the ones among all functions of its cells and tissues, which strongly resisted disease.

Educated persons, more psychic and physically responsive in enclosed situations accounted for a large share of the difficult patients (with acute cerebral symptoms of a maniacal or more often depressive nature) in the epidemic just as persons of physical labor readily endured the disease and ~~and~~ only seldom exhibited cerebral phenomena.

In cases where unconscious conditions of the patient were indicated by a rush of blood to the head (red face, apoplexy habitus)-- excellent results were obtained by venous section (generally by letting out 150-200° of the blood with a subsequent venous transfusion of physiological salt solution. The patients, after this were positively revived; consciousness became clear, the pulse, up to now scarcely perceptible and irregular, became fully developed. This action was fervently carried out in the south and always gave completely satisfactory results.

In the case of ex. typhus, similarly with typhoid fever, a slowing down of the pulse in comparison with the temperature is often observed in the beginning of the illness and in the course of the first week of the disease. Thus with a temperature of 39-40° the pulse often amounts to only 84-90 beats per minute whereas the pulse usually increases during ex. typhus to 120 and in severe cases even to 140-150 beats per minute.

In this brief outline, I want to share my observations on cases of mixed infection of ex. typhus and relapsing fever. Of such cases, I observed but a few (6 in all) among the general number of observations of typhus and relapsing fever (more than 1000 cases) and I will not draw conclusions. In this relation, there are very desirable further observations. (i.e. many more observations are need along this line- trans.)

I did not find detailed descriptions of the common course of these two typhus diseases (i.e. typhus and rel. fever) in the literature. There are indications of a combination of typhus with erysipelas, dysentery, whooping cough, diphtheria, croupous pneumonia and typhoid fever. There are even

some figures. Thus, for example, according to the indications of Prof. Flerov, Yudin, among 332 cases they saw 1 case of relapsing fever and five cases of erysipelas; Gaul' among 2422 observations saw 2 cases of relapsing fever, 5 small pox and 2 scarlet fever, Vorob'ev in 1918-19 noted 2 cases of relapsing fever and 9 cases of erysipelas etc.

Most often one comes across ex. typhus and erysipelas, and typhus and typhoid fever. The combination with erysipelas (usually at the end of the disease or after termination of the fever) occurs, as Prof. Flerov indicated, from the fact that persons sick and in a state of unconsciousness broke the surface of the mucous membrane of the nose with their fingers. Complication by erysipelas was serious: the process takes its course slowly and often proves fatal.

Quite frequently the combination of ex. typhus and typhoid fever is explained partly by what could be termed an error of diagnosis. As indicated by Prof. Pletnev and noted in the south the revived Vidal reaction serves as the source of the error (i.e. the revived reaction with ex. typhus) transferred earlier as typhoid fever and paratyphoid fever or vaccinated against it. Such a revived Vidal reaction was observed for other contagious diseases.

As a guide, Vidal's reaction takes earlier than the Weil-Felix reaction and in proportion with the growth of Weil-Felix reaction the Vidal subsides. In such cases ^{then} typhus and typhoid fever are combined, the last reaction along with the abundant characteristic typhus rash with catarrhal symptoms in light and other specific symptoms for typhus confirms the diagnosis. In the cases of mixed infection of typhus and relapsing fever which I observed, ~~the~~ generally the typhus was superimposed on the second attack of relapsing fever and in such cases, prolonged temperatures of the second attack of relapsing fever became comprehensible only with the appearance of abundant roseola-petechial rashes which are characteristic of typhus, and the positive reactions of Wiener, Weil-Felix and others also characteristic of typhus. We are never guided by one rash in the formulation of the diagnosis since relapsing fever also often ran its course, although admittedly it was unusual, with everyone having a rash. There was a case where typhus occurred between stages of relapsing fever, moving them apart onto the time period of its own course and at the expiration of the typhus the relapsing fever followed in its period.

During examination of the blood it was shown that Obermeir's spirochaete disappeared from the blood during the superposition of typhus, that in the first cases of it they were not found even on the third day, in second-- in all, but not always, but after the subsidence of the typhus, the temperatures advanced following the attack of relapsing fever and the spirochaete again appeared in the blood. Consequently, typhus did not end but only disjoined and lengthened the interval between the two attacks of relapsing fever. The course of typhus, which was superimposed on relapsing fever, was rather mild: temperature, not reaching a high figure, cerebral symptoms were not observed, consciousness remained clear, sharp complications in the lungs, liver, kidneys, peripheral nervous system were not observed and only the heart weakened by it and other infections gave a picture of significant myocarditis. Most often the superimposition of typhus at the second stage of relapsing fever is included, it seems to me,

simultaneously or about the time the organism is infected by one or another disease, but distinguished by the length of the incubation period. If the incubation period of typhus is figured as 14 days and that of relapsing fever at 4-7 days, an illness of typhus rightly coincides with the second attack of relapsing fever or is superimposed on relapsing fever in the first afebrile period. It is of course impossible to deny that even later infections of typhus already exist at the time of the course of relapsing fever with the crowding of the patients and the heterogeneity of the infections in the general wards of medical institutions, heterogeneity of the the infections in apartments and homes. I cite a short extract from the case histories which I observed.

1st Case. Patient N, 40 yrs. old. Official of the war office, became ill 6 Feb. 1920 at home: as a starting point, sharp pains in the muscles of the calf and foot, temperature raised to 40° ; I saw the patient and stated the following:

Complaints: general indisposition, legs ached. A few days before becoming ill, he arrived from the region of Zherink station. St. praes. of correct build, satisfactorily nourished. Temperature of constant pattern in the limits $39-40^{\circ}$, consciousness full. Spleen sharply enlarged and diseased at the time of palpation. The calf and foot muscles ached at the time of examination. Obermeier's spirochaete was found during the blood examination.

On the 6th day after becoming sick, the temperature dropped to normal and the afebrile period came on, lasting 5 days. In spite of the appearance of general weakness, other symptoms were not observed in this period.

16 Feb. 1920. In the evening the temperature rose again nearly to 39° at the time of the enlargement of the spleen, complete consciousness and general indisposition. Studies of the blood on the 17th showed positive results for Obermeier's spirochaete, 18th likewise but on the 19th on the third day after he became sick (i.e. for the second time) no further spirochaetes were discovered in the blood although the temperature continued to remain and continued beyond the 6th day, and for this reason the patient was transferred to the hospital for detailed and close study.

The general condition of the patient became worse on the 20th, hyperaemia of the eyelids appeared, distracted hoarseness in the lungs, and on the 24th there appeared on the abdomen and upper part of the chest and next even on the entire body a profuse roseola rash typical of typhus which broke out after two days in petechiae. Wiener positive on 20th and Weil-Felix sharply positive in dilutions of 1:200/ on the 28th, that is, approximately 9 days after the sickness started; Vidal was negative. Diagnosis: ex. typhus/ Care and usual treatment.

The disease ran its course with the complete consciousness of the patient, pulmonary bronchitis and temperatures between the limits $39.5-40^{\circ}$ up to 14 days and drops to normal in 2 days. The role of the heart: sharpness of the tones within normal limits and the pulse increased to 100-110 beats per minute. Normal temperature remained for 10 days and then on the 14th March again with chills the temperature increased to 39.90 and again the spirochaete is detected in the blood, the third attack

(of relapsing fever) comes on and continues for 2 days and with this the illness is concluded. The patient is discharged from the hospital 2 weeks after the third attack. No complications were detected.

2nd case. Patient S, 27 years old, treated in the hospital with complaints of general indisposition, head aches and pains in the legs. Sick 2 days. Became ill on the journey.

St. pr. Complete consciousness, pale, spleen enlarged. Temperature 40°. Obermeiers spirochaete detected in the blood. 2 days after becoming ill the first attack of relapsing fever terminated and after 4 (ore) days the second attack occurred lasting 2 days after which the second afebrile period set in. But 2 days after the fall of the temperature it again rose and in 2 days reaches 39.5 remaining at this high figure of constant pattern and in the following days, the spirochaetes are not in the blood; in 4 days the characteristic rash of typhus developed; in 7 days Weil-Felix weakly positive, on the tenth day, sharply positive in $4/111$ dilutions of 1:200. Vidal in 10 days in dilutions of 1:200 was negative but in dilutions of 1:50 and 1:100 was weakly positive. Rash developed on the entire body including the face.

Diagnosis: exanthematic typhus. Within the 2nd afebrile period the typhus ran its course in 15 days with complete consciousness; temperature fluctuating from 39-39.8° without complications with the lungs and other organs. 5/V the temperature dropped to normal but 14/V again rose to 39.9 and again spirochaetes were detected in the blood. The 3rd attack of relapsing fever lasted 2 days; after 15 days the patient was discharged; there were no complications.

3rd case. Patient S, 36 years old, arrived from front, entered the hospital on 3rd day after becoming sick 14 Jan with a temperature of 39.6°. Obermeier's spirochaete in blood and other symptoms of relapsing fever.

16 Jan 1920. Temperature dropped but on 19th again rose in 2 days to 40°. Obermeier's spirochaete was not in the blood either on the 19th or 20th, and was not detected later. The profuse rash typical of typhus appeared on the 21st; 28 Jan Weil-Felix strongly positive; Vidal weakly positive in dilutions of 1:200.

On 3 Feb., that is on the 14th day, the temperature fell and on the 5th of Feb, it was normal but not for long; that is, already on the 8th it again rose and the second attack of relapsing fever came on, lasting for three days. This concluded the illness.

The remaining three cases are analagous to the first three, that is, ex. typhus was superimposed near the second attack of relapsing fever.

(trans. from the Russian, Feb. 1955, C.R.Robins)